

Summary of Monitoring Plan for Gulf Island Pond and Androscoggin River for Summer 2004

Purpose:

1. To better define the levels of chlorophyll a and color that corresponds to algae blooms in Gulf Island Pond.
2. Obtain ambient data under reduced point source discharge conditions. Note the degree of improvement and/or non-compliance of class C water quality standards.
3. Obtain additional updated information on phosphorus assimilation in the Androscoggin River above Gulf Island Pond.

Definition of an Algae Bloom –An algae bloom in a Maine lake is currently defined as a planktonic growth of algae which causes Secchi depth to be less than 2 meters. (DEP Rules Chapter 581). In addition staff recommends that if apparent or true color exceeds 30 SPU, uncorrected chlorophyll-a should be greater than 8 ppb to confirm an algae bloom. Although Gulf Island Pond is legally classified as a river, it does not always act like a river or even a lake. Water quality is not longitudinally uniform as would be expected in a lake. It is expected that color in Gulf Island Pond almost always exceeds 30 SPU.

Given the absence of statistical confidence in predicting an algae bloom based upon chlorophyll a concentration, data specific to Gulf Island Pond will be correlated to bloom conditions. Observable blooms and scums will be documented visually and threshold bloom levels will be defined by the corresponding measured chlorophyll-a and color. In addition, aerial monitoring will be undertaken to confirm the extent of blooms and scums throughout the pond. Significant dissolved oxygen supersaturation (typically approaching 110%) in the readings closest to the water surface generally also confirms the occurrence of an algae bloom.

Monitoring Duration and Frequency – June 1 to Sept 30. Weekly sampling should occur preferably on the same day of the week (every Thursday). Fridays should be avoided to ensure sample holding times are met. Sampling in any given week may be suspended during extreme precipitation events that result in abnormally high river flows. DEP should be consulted as to whether or not sampling can be suspended in any given week. In addition, 2-3 samples will be taken within the area of a bloom as confirmed by aerial monitoring.

Ambient Monitoring Androscoggin River - The following should be collected above and below each mill discharge. Historic sampling sites should be utilized as shown below.

Locations:	Berlin Mill	Above Burgess mill and below Cascade mill.
	Rumford Mill:	Virginia Bridge; Dixfield Bridge
	Jay Mill:	Riley Dam; Livermore Falls Rte 4
	Field Duplicate:	1 / every other week
Parameters:	TP, TN, ortho-P;	true color early AM. DO/temp in early AM, Mid PM.
	Secchi depth	in PM.

Ambient Monitoring Gulf Island Pond – The following parameters should be collected at the deepest area of the pond cross section at the following locations in Gulf Island Pond.

Locations:

- Twin Bridges
- Upper Narrows
- Lower Narrows
- GIP#4
- Deep Hole
- 1 Field Duplicate / 1 every other week

All parameters listed below are integrated depth cores taken to a depth of 2 times the Secchi depth reading but not exceeding 10 M. Sampled in early AM.

- TP, ortho-P
- TKN, NH₃-N, NO₂+3-N of integrated depth sample
- Chl-a corrected and uncorrected integrated depth sample
- True Color of integrated depth sample

Also undertake the following in early AM and Mid PM

- DO/ Temp from surface to 0.5 M off bottom at 1 M profiles
- Secchi Depth transparency
- Visual Observations of algae blooms and scums noted on sample sheet.

Aerial Monitoring – Sample at 2-3 locations within area of observed bloom

- Chl-a corrected and uncorrected
- Secchi Depth
- True color

Effluent TP, Ortho-P monitoring.

- Responsibility of WWTP Facility
- Composite samples taken at a frequency of:

Mills – 3 times / Week. Includes Fraser Burgess and Cascade; Mead; and IP.

Large Municipal – 1 / Week. Includes Berlin, Gorham, Rumford Mex., Livermore Falls.

Small Municipal – 1 / Month. Includes Bethel, Rumford Point, North Jay.

Cost of Laboratory Analysis of Ambient Samples (assuming HETL, Augusta)

	Amt/week	Cost ea.	Cost / week
TP	11	\$21	\$231
Ortho-P	11	\$21	\$231
TN	5	\$42	\$210
TKN	5	\$28	\$140
NH ₃ -N	5	\$14	\$70
NO ₂ +3-N	5	\$14	\$70
Chl-a	5	\$36	\$180
True Color	11	\$14	\$154

Total/week \$1,286

Total 18 weeks \$23,148

Note: All sampling should follow DEP protocols as described in Androscoggin River Monitoring Work Plan 2004. Training will be provided by DEP personnel. Early morning sampling should target completion by 8 AM and afternoon sampling should begin no earlier than 1 PM.